BAKER BAY
WEST CHANNEL
SEDIMENT QUALITY EVALUATION
REPORT

November 2004

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Corps of Engineers
CENWP-EC-HR

ACRONYMS

Ag	Silver
As	Arsenic
Cd	Cadmium
CoC	Contaminate of concern
Cr	Chromium
CRM	Columbia River Mile
Cu	Copper
DMEF	Dredge Material Evaluation Framework
EPA	Environmental Protection Agency
Hg	Mercury
J	Laboratory estimated value detected between MRL & MDL
MDL	Method Detection Limit
MLLW	Mean Lower Low Water
MRL	Method Reporting Limit
ND	Non-detected at MRL or MDL
NES	Newly Exposed Surface
Ni	Nickel
PAH	Polynuclear Aromatic Hydrocarbon
Pb	Lead
PCB	Polychlorinated Biphenyl
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RMT	Regional Management Team
Sb	Thallium
SL	Screening Level
Tier II	Physical (a) & Chemical (b) analyses
Tier III	Bioassay & Bioaccumulation analyses
TOC	Total Organic Carbon
TVS	Total Volatile Solids
U	Laboratory non-detect at MRL
USFWS	U. S. Fish & Wildlife Service
WDNR	Washington Department of Natural Resources
Zn	Zinc
∑	Total value (i.e. DDT + DDE + DDD)

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ABSTRACT

Baker Bay is on the Washington side of the Columbia River and is traversed from the west by West Channel, a federally maintained navigation project, extending from the Columbia River project at River Mile (RM) 2.5, upstream to the entrance of Ilwaco Boat Basin. The channel is maintained to a depth of 16 feet, is 3.2 miles in length and maintained to a width of 150 to 200 feet. Ilwaco (East) Channel, which is not maintained, runs generally east from Ilwaco and intersects Chinook Entrance Channel east of East Sand Island.

This evaluation was conducted following procedures set forth in the Ocean Testing Manual and Inland Testing Manual, developed jointly by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency to assess dredged material. Guidelines used are those developed to implement the Clean Water Act and Marine Protection, Research and Sanctuaries Act. These national guidelines and associated local screening levels are those adopted for use in the regional Dredge Material Evaluation Framework for the Lower Columbia River Management Area (DMEF), November 1998.

A total of six (6) box-core surface grab sediment samples were collected along the length of the West Baker Bay Channel June 29, 2004. All samples were submitted for physical analyses including total volatile solids; 3 samples were analyzed for metals (9 inorganic), total organic carbon, pesticides and polychlorinated biphenyls, phenols, phthalates, miscellaneous extractables, polynuclear aromatic hydrocarbon, with 1 sample analyzed for both porewater and total sediment organotin.

Physical analyses are presented in Table 2. Three (3) samples were classified as “elastic silt, and 3 samples as “poorly graded sand.” Mean grain-size for all the samples was 0.15 mm (range 0.132mm to 0.289mm), with 1.37% gravel (range 0.0% to 6.6%), 51.32% sand (range 2.0% to 98.8%), and 47.32% fines (range 1.0% to 97.6%). Volatile solids for all samples ranged from 0.3% to 4.6% with a mean value of 2.12%.

The chemical data collected indicates low levels of 6 metals present in all samples analyzed, but levels do not approach their respective DMEF screening levels. All total DDT, PCB, PAH, phthalates and Organotin detection/ reporting levels were low, with non-detect (ND) results reported. The laboratory failed to reach sufficiently low detection levels for phenols, semi-volatile compounds (see lab data sheet, Appendix A). Material from Baker Bay and the Mouth of the Columbia River have not historically had a problem with the presence of significant levels of these semi-volatile compounds, with no point sources present; the few elevated detection/reporting levels are not viewed as a problem in determining the material represented to be suitable for open in-water placement without further characterization.

INTRODUCTION

This report characterizes the sediment to be dredged at the Baker Bay West channel for the purposes of dredging and disposal. The sampling and analysis objectives are stated in the Sampling and Analysis Plan (SAP June 2004), and are also listed below. This report will outline the procedures used to accomplish these objectives.

Sampling and Analysis Objectives

- To characterize sediments in accordance with the DMEF manual.
- Collect, handle and analyze representative sediment samples, of the proposed dredging prism, in accordance with protocols and Quality Assurance/Quality Control (QA/QC) requirements.
- Characterize sediments to be dredged for evaluation of environmental impact upon disposal.
- Conduct physical and chemical characterization of dredge prism.

PREVIOUS STUDIES

Baker Bay West Channel sediment quality investigations have been carried out at various yearly intervals since 1973, with the last investigation at Baker Bay being done in 1997. In 1987 testing for physical properties, bulk chemistry (including elutriate tests) and bioassays were conducted. Sediments were found to be acceptable for in-water disposal at a dispersive site to avoid any adverse effect that might be derived from ammonia concentrations that were detected during elutriate testing. The results of the physical and bulk chemical testing done in 1992 and 1997 showed the materials to be clean sands between CM 0.0 and 2.9; from CM 2.9 to the boat basin entrance the materials were fine-grained, all of which was suitable for unconfined in-water disposal.

CURRENT SAMPLING EVENT/DISCUSSION

A total of six (6) samples were collected from the West Channel at Baker Bay, June 29, 2004 (see Figure 2 and Table 1). The samples were collected using a Box-core sampling device (BC). All samples were submitted for physical analyses including total volatile solids; 3 samples were analyzed for metals (9 inorganic), total organic carbon, pesticides and polychlorinated biphenyls, phenols, phthalates, miscellaneous extractables, polynuclear aromatic hydrocarbon, with 1 sample analyzed for both porewater and total sediment organotin.

Table 1. Sample Location Coordinates
(NAD 83, Oregon State Plane North)

0604BB-BC-01	46˚ 17’ 59.8” 124˚ 02’ 28.7”	0604BB-BC -02	46˚ 17’ 41.9” 124˚ 02’ 40.5”
0604BB-BC -03	46˚ 17’ 32.7” 124˚ 02’ 48.8”	0604BB-BC -04	46˚ 16’ 51.5” 124˚ 02’ 36.2”
0604BB-BC -05	46˚ 16’ 38.0” 124˚ 02’ 03.4”	0604BB-BC -06	46˚ 16’ 20.4” 124˚ 01’ 52.0”

RESULTS

Physical and Volatile Solids (ASTM methods)

Six (6) samples were submitted for physical analyses, with the data presented in Table 2. Three (3) samples were classified as “elastic silt", and 3 samples as “poorly graded sand.” Mean grain-size for all the samples was 0.15 mm (range 0.132mm to 0.289mm), with 1.37% gravel (range 0.0% to 6.6%), 51.32% sand (range 2.0% to 98.8%), and 47.32% fines (range 1.0% to 97.6%). Volatile solids for all samples ranged from 0.3% to 4.6% with a mean value of 2.1%.

Metals (EPA method 6010/7471), Total Organic Carbon (EPA method 415.1)

Three (3) samples were submitted for metals and TOC testing, with the data presented in Table 3. The TOC ranged from 11,000 to 17,000 mg/kg (ppm) in the samples. Low levels of some metals were detected, but did not approach the DMEF screening level (SL). The levels detected are consistent with historical levels of metals detected in the West Channel.

Pesticides/PCBs (EPA method 8080), Phenols, Phthalates and Miscellaneous Extractables (EPA method 8270)

Three (3) samples were submitted for pesticides/PCBs, phenols, phthalates and miscellaneous extractables. All pesticide,[1] PCB[2] and Organotin[3] detection/ reporting

[1] Total DDT was non-detect (ND) at <1.2 ug/kg for all samples. DMEF screening level (SL) for Total DDT is 6.9 ug/kg. The detection level for chlordane was elevated (20ug/kg), in 1997 was ND at 2ug/kg, DMEF - SL is 10ug/kg.
[2] Total PCB Aroclor were ND at <23 ug/kg for all samples. DMEF – SL for total PCB Aroclors is 130 ug/kg.
[3] Total Organotin (TBT) was <0.05 ug/L (pore water) & < 2.1 ug/kg total in sediment. DMEF pore water SL is 0.15ug/L; 73ug/kg is the SL for total sediment (no DMEF - SL for total bulk TBT).

levels were low, with non-detect (ND) results reported. All semi-volatile[4] (Phenols, Phthalates & Misc. Extractables) results were ND, as well, but had somewhat elevated detection/reporting levels, with most at or below DMEF screening levels (see Appendix A).

Polynuclear Aromatic Hydrocarbons (EPA method 8270C) [5]

Three (3) samples were submitted for semi-volatile analyses. No "low molecular weight" or "High molecular weight" PAHs were detected in any samples. All other semi-volatile (phenol, phthalates, misc. extractables) results were non-detect, but some had somewhat elevated detection/reporting levels. The laboratory failed to reach sufficiently low detection levels for several semi-volatile compounds (see raw data, Appendix A). Material from Baker Bay and the Mouth of the Columbia has not historically had a problem with the presence of significant levels of semi-volatile compounds, with no point sources present; the few elevated detection/reporting levels are not viewed as a problem in determining the material represented to be suitable for open in-water placement without further characterization.

CONCLUSION

This evaluation was conducted following procedures set forth in the Inland Testing Manual, developed jointly by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency to assess dredged material and the Dredge Material Evaluation Framework for the Lower Columbia River Management Area (DMEF). The DMEF is a regional manual developed jointly with regional EPA, Corps, Oregon Department of Environmental Quality and Washington Departments of Ecology and Natural Resources. This document is a guideline for implementing the Clean Water Act (40 CFR 230), Section 404 (b)(1). The screening levels used are those adopted for use in the DMEF, final November 1998. The DMEF tiered testing approach requires that material in excess of 20% fines and greater than 5% volatile solids, as well as any material with prior history or is suspected ("reason to believe") of being contaminated, be subjected to physical (Tier IIa) as well as chemical (Tier IIb) analyses.

Of the 6 samples collected form the West Channel at Baker Bay 3 were submitted for chemical analyses, 0604BB-BC-01 thru 03. Samples 04 thru 06 contained an average of 98.5% sand, were not near any source of contamination and were not submitted for chemical analyses. The chemical data collected indicates low levels of 6 metals present in

[4] All PAH (method 8270C) detection/reporting levels were less than there respective DMEF screening levels. Laboratory detection limits were elevated for 2-Methyl Phenol, 2,4-Dimethylphenol, N-Nitrosodiphenylamine (these compounds were not detected in the 1997 sampling event, at low detection levels or in other earlier sampling events, there is no source in the area to make the presence of these compounds likely).

[5] All PAHs (method 8270C) were ND at less than their respective DMEF screening level.

all samples analyzed, but levels do not approach their respective DMEF screening levels. All pesticide, PCB, PAHs, Phthalates and Organotin detection/ reporting levels were low, with non-detect (ND) results reported. All additional semi-volatile compounds (Phenols & misc. extractable) results were ND, also, but the laboratory failed to reach sufficiently low detection levels for several semi-volatile compounds (see lab data sheet, Appendix A). Material from Baker Bay and the Mouth of the Columbia has not historically had a problem with the presence of significant levels of these semi-volatile compounds, with no point sources present; the few elevated detection/reporting levels are not viewed as a problem in determining the material represented to be suitable for open in-water placement without further characterization.

REFERENCES

1. U.S. Army Corps of Engineers, Portland District and Seattle District; U.S. Environmental Protection Agency, Region 10; Oregon Department of Environmental Quality; Washington State Department of Natural Resources and Department of Ecology. 1998 Final. Dredge Material Evaluation Framework for the Lower Columbia River Management Area.

2. U.S. Environmental Protection Agency and U.S. Army Corps of Engineers. February 1998. Evaluation of Dredged Material Proposed for Discharge in Inland and Near Coastal Waters - Testing Manual (referred to as the "Inland Testing Manual").

3. U.S. Army Corps of Engineers, U.S. Environmental Protection Agency. February 1991. Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Manual (referred to as the OTM or the "Green Book"). U.S. Army Corps of Engineers. January 2003. Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, or Upland Confined Disposal Facilities - Testing Manual (referred to as the "Upland Testing Manual").

4. Clean Water Act, 40 CFR 230 (b)(1).

5. PSDDA. 1996. Puget Sound Dredged Disposal Analysis, Technical Information Memorandum, Testing, Reporting and Evaluation of Tributyltin Data in PSDDA and SMS Programs.

6. U.S. Army Corps of Engineers. June 2004. Sediment Sampling and Analysis Plan, West Channel Baker Bay. Portland District.

7. U.S. Army Corps of Engineers. June 1997. Sediment Sampling and Analysis Plan, West Channel Baker Bay. Portland District.

8. U.S. Army Corps of Engineers. June 1997. West Channel Baker Bay Sediment Evaluation Report. Portland District.

9. U.S. Army Corps of Engineers. August 1992. West Channel Baker Bay Sediment Evaluation Report. Portland District.

10. U.S. Army Corps of Engineers. December 1988. West Channel Baker Bay Sediment Evaluation Report. Portland District.

11. U.S. Army Corps of Engineers. June 1981. West Channel Baker Bay Sediment Evaluation Report. Portland District.

12. U.S. Army Corps of Engineers. July - August 1980. West Channel Baker Bay Sediment Evaluation Report. Portland District.

Table 2: Physical Analysis and Volatile Solids
Sampled June 29, 2004

Sample I.D.	Grain Size (mm)	Percent			
	Mean	Gravel (Clam Shells)	Sand	Silt/Clay	Volatile Solids
0604BB-BC-01	0.0132	0.4	2.0	97.6	4.6
0604BB-BC-02	0.0191	6.6	3.9	89.5	3.9
0604BB-BC-03	0.0228	1.1	6.5	92.4	3.0
0604BB-BC-04	0.2889	0.0	97.9	2.1	0.3
0604BB-BC-05	0.2815	0.0	98.7	1.3	0.5
0604BB-BC-06	0.2739	0.1	98.9	1.0	0.4
Mean	0.15	1.37	51.32	47.32	2.12
Minimum	0.0132	0.0	2.0	1.0	0.3
Maximum	0.2889	6.6	98.9	97.6	4.6

Table 3: Inorganic Metals and TOC

Sample I.D.	As	Cd	Sb	Cu	Pb	Ni	Ag	Zn	Hg	TOC
	mg/kg (ppm)									
0604BB-BC-01	10.3	<0.077	<0.26	43.8	19.3	20.1	0.458	116	0.17	17000
0604BB-BC-02	6.50	<0.056	<0.190	27.3	13.9	15.2	<0.228	89.3	0.08	11000
0604BB-BC-03	6.16	<0.059	<0.200	28.0	14.5	15.3	0.364	93.5	0.08	12000
Screening level (SL)	57	5.1	150	390	450	140	6.1	410	0.41	
Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit). Samples 0604BB-BC-04 thru 06 were not submitted for chemical analyses, they averaged 98.5% sand.										

Figure 1. Baker Bay West Channel Vicinity Map

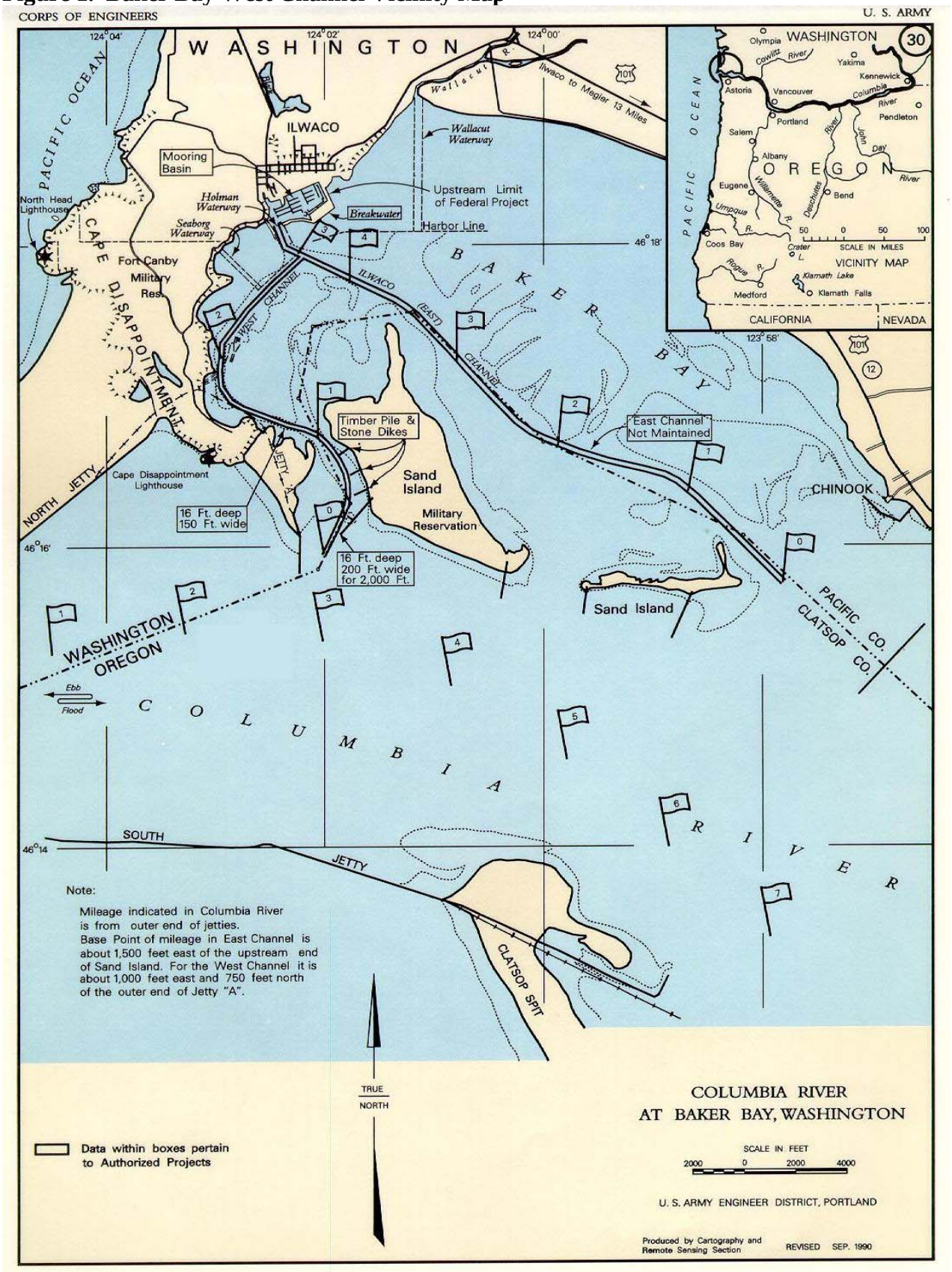


Figure 2. Baker Bay West Channel, Sediment Sampling Station Locations

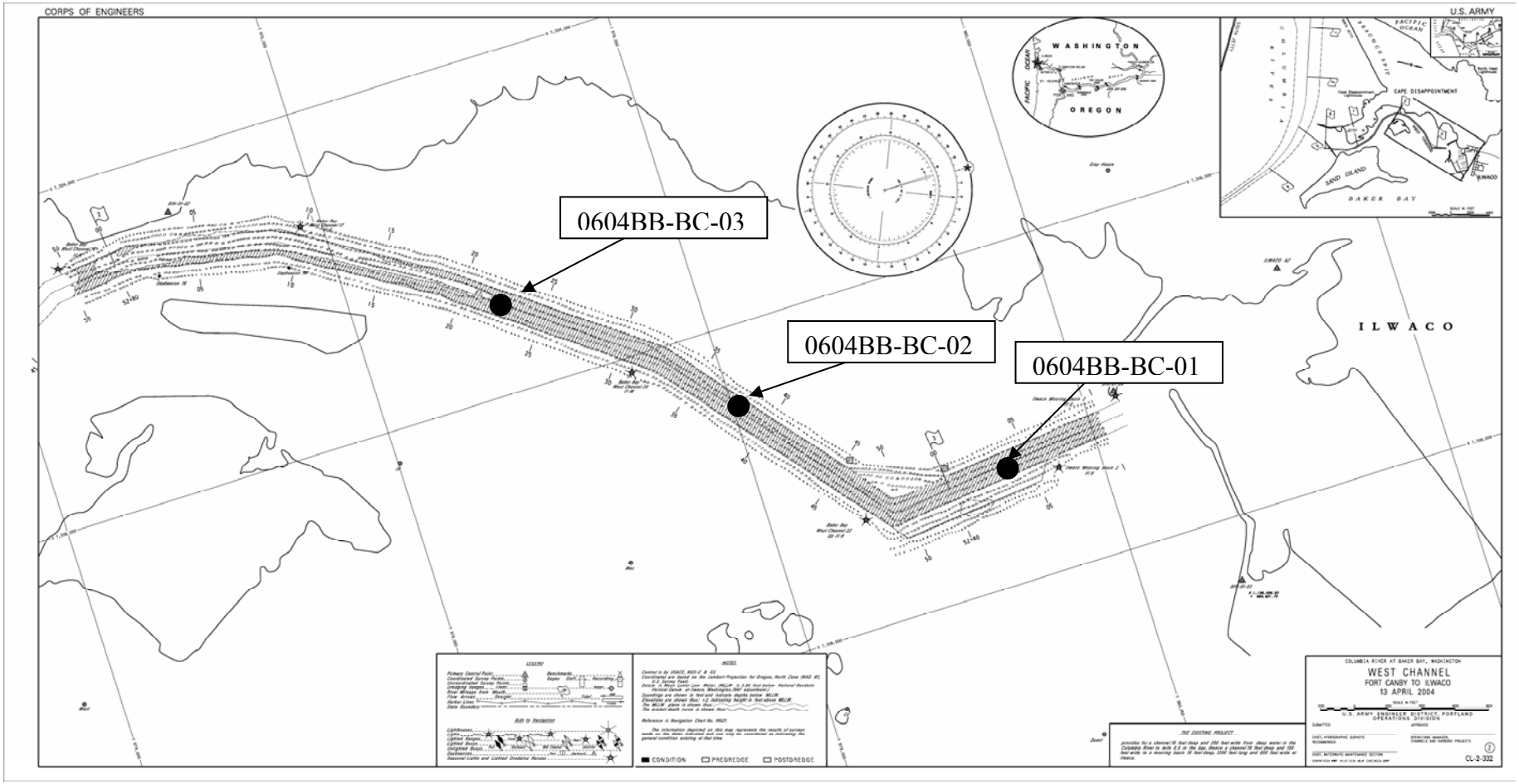
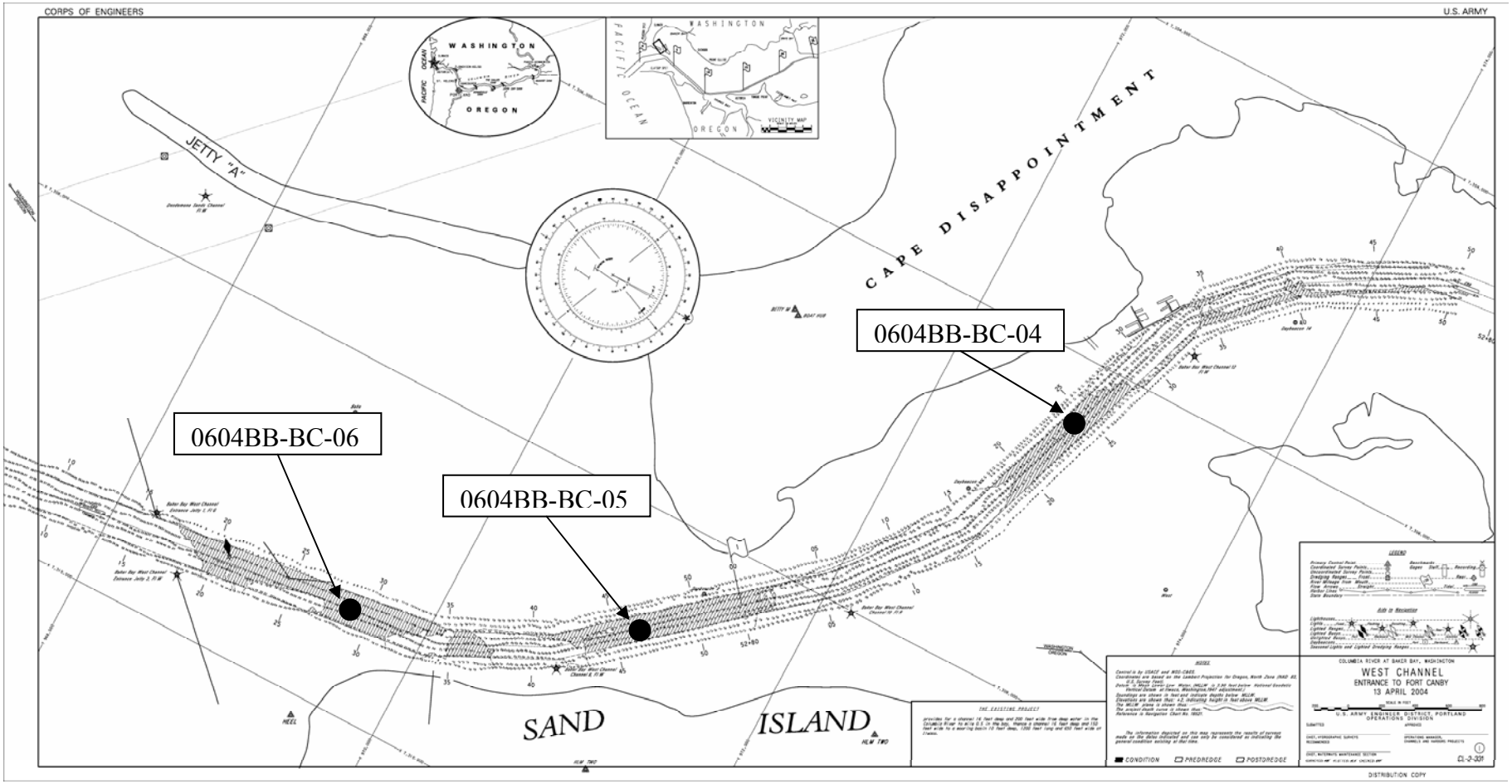


Figure 2 (cont'd). Baker Bay West Channel, Sediment Sampling Station Locations



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DMEF (1998) SL	ID	CHEMICAL_NAME	CONC MDL	UNIT	BASIS	CODE	ANALYSIS
	BB-BC-01	Total Organic Carbon	17,000	PPM	TOC	#	#
	BB-BC-01	Pesticides & PCBs				#	SW8080
	BB-BC-01	alpha-BHC	<0.4	PPB	DRY	U	SW8080
10	BB-BC-01	gamma-BHC (Lindane)	<0.4	PPB	DRY	U	SW8080
	BB-BC-01	beta-BHC	<0.6	PPB	DRY	U	SW8080
10	BB-BC-01	Aldrin	<0.4	PPB	DRY	U	SW8080
10	BB-BC-01	Heptachlor	<0.3	PPB	DRY	U	SW8080
	BB-BC-01	delta-BHC	<0.8	PPB	DRY	U	SW8080
	BB-BC-01	Heptachlor Epoxide	<0.6	PPB	DRY	U	SW8080
	BB-BC-01	Endosulfan I	<0.4	PPB	DRY	U	SW8080
∑6.9	BB-BC-01	4,4'-DDE	<0.4	PPB	DRY	U	SW8080
10	BB-BC-01	Dieldrin	<0.5	PPB	DRY	U	SW8080
	BB-BC-01	Endrin	<0.3	PPB	DRY	U	SW8080
∑6.9	BB-BC-01	4,4'-DDD	<0.9	PPB	DRY	U	SW8080
	BB-BC-01	Endosulfan II	<0.5	PPB	DRY	U	SW8080
	BB-BC-01	Endrin Aldehyde	<0.7	PPB	DRY	U	SW8080
∑6.9	BB-BC-01	4,4'-DDT	<1.0	PPB	DRY	U	SW8080
	BB-BC-01	Endosulfan Sulfate	<0.8	PPB	DRY	U	SW8080
	BB-BC-01	Methoxychlor	<1.0	PPB	DRY	U	SW8080
	BB-BC-01	Endrin Ketone	<0.4	PPB	DRY	U	SW8080
10	BB-BC-01	Chlordane	<20	PPB	DRY	U	SW8080
	BB-BC-01	Toxaphene	<18	PPB	DRY	U	SW8080
∑130	BB-BC-01	PCB-1016	<7	PPB	DRY	U	SW8080
∑130	BB-BC-01	PCB-1221	<5	PPB	DRY	U	SW8080
∑130	BB-BC-01	PCB-1232	<21	PPB	DRY	U	SW8080
∑130	BB-BC-01	PCB-1242	<4	PPB	DRY	U	SW8080
∑130	BB-BC-01	PCB-1248	<10	PPB	DRY	U	SW8080
∑130	BB-BC-01	PCB-1254	<2	PPB	DRY	U	SW8080
∑130	BB-BC-01	PCB-1260	<8	PPB	DRY	U	SW8080
	BB-BC-01	TCMX (SURROGATE)	25.5	PCT		#	SW8080
	BB-BC-01	DCB (SURROGATE)	30.1	PCT		#	SW8080
	BB-BC-01	B/NA Extractables Soil				#	SW8270C
	BB-BC-01	bis(2-Chloroethyl)ether	<170	PPB	DRY	U	SW8270C
420	BB-BC-01	Phenol	<180	PPB	DRY	U	SW8270C
	BB-BC-01	2-Chlorophenol	<160	PPB	DRY	U	SW8270C
170	BB-BC-01	1,3-Dichlorobenzene	<160	PPB	DRY	U	SW8270C
110	BB-BC-01	1,4-Dichlorobenzene	<160	PPB	DRY	U	SW8270C
35	BB-BC-01	1,2-Dichlorobenzene	<170	PPB	DRY	U	SW8270C
	BB-BC-01	2,2'-oxybis(1-Chloropropane	<170	PPB	DRY	U	SW8270C
63	BB-BC-01	2-Methyl Phenol	<220	PPB	DRY	U	SW8270C
1400	BB-BC-01	Hexachloroethane	<190	PPB	DRY	U	SW8270C
28	BB-BC-01	N-Nitroso-di-n-propylamine	<190	PPB	DRY	U	SW8270C
670	BB-BC-01	3&4-Methyl Phenol	<670	PPB	DRY	U	SW8270C
	BB-BC-01	Nitrobenzene	<190	PPB	DRY	U	SW8270C

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SL	ID	CHEMICAL_NAME	CONC MDL	UNIT	BASIS	CODE	ANALYSIS
	BB-BC-01	Isophorone	<160	PPB	DRY	U	SW8270C
	BB-BC-01	2-Nitrophenol	<140	PPB	DRY	U	SW8270C
29	BB-BC-01	2,4-Dimethylphenol	<180	PPB	DRY	U	SW8270C
	BB-BC-01	bis (2-Chloroethoxy)	<170	PPB	DRY	U	SW8270C
	BB-BC-01	2,4-Dichlorophenol	<140	PPB	DRY	U	SW8270C
31	BB-BC-01	1,2,4-Trichlorobenzene	<160	PPB	DRY	U	SW8270C
2100	BB-BC-01	Naphthalene	<160	PPB	DRY	U	SW8270C
29	BB-BC-01	Hexachlorobutadiene	<160	PPB	DRY	U	SW8270C
	BB-BC-01	4-Chloro-3-methylphenol	<160	PPB	DRY	U	SW8270C
670	BB-BC-01	2-Methyl Naphthalene	<140	PPB	DRY	U	SW8270C
	BB-BC-01	Hexachlorocyclopentadiene	<77	PPB	DRY	U	SW8270C
	BB-BC-01	2,4,6-Trichlorophenol	<140	PPB	DRY	U	SW8270C
	BB-BC-01	2,4,5-Trichlorophenol	<180	PPB	DRY	U	SW8270C
	BB-BC-01	2-Chloronaphthalene	<160	PPB	DRY	U	SW8270C
560	BB-BC-01	Acenaphthylene	<160	PPB	DRY	U	SW8270C
1400	BB-BC-01	Dimethyl Phthalate	<130	PPB	DRY	U	SW8270C
500	BB-BC-01	Acenapthene	<120	PPB	DRY	U	SW8270C
	BB-BC-01	2,4-Dinitrophenol	<60	PPB	DRY	U	SW8270C
	BB-BC-01	2,4-Dinitrotoluene	<120	PPB	DRY	U	SW8270C
	BB-BC-01	4-Nitrophenol	<160	PPB	DRY	U	SW8270C
540	BB-BC-01	Fluorene	<120	PPB	DRY	U	SW8270C
	BB-BC-01	4-Chlorophenyl Phenyl Ether	<150	PPB	DRY	U	SW8270C
1200	BB-BC-01	Diethyl Phthalate	<110	PPB	DRY	U	SW8270C
	BB-BC-01	2-Methyl-4,6-dinitrophenol	<90	PPB	DRY	U	SW8270C
28	BB-BC-01	N-Nitrosodiphenylamine	<80	PPB	DRY	U	SW8270C
	BB-BC-01	4-Bromophenyl Phenyl Ether	<120	PPB	DRY	U	SW8270C
22	BB-BC-01	Hexachlorobenzene	<110	PPB	DRY	U	SW8270C
400	BB-BC-01	Pentachlorophenol	<90	PPB	DRY	U	SW8270C
1500	BB-BC-01	Phenanthrene	<100	PPB	DRY	U	SW8270C
960	BB-BC-01	Anthracene	<120	PPB	DRY	U	SW8270C
5100	BB-BC-01	Di-n-butylphthalate	<110	PPB	DRY	U	SW8270C
1700	BB-BC-01	Fluoranthene	<100	PPB	DRY	U	SW8270C
	BB-BC-01	Benzidine	<1400	PPB	DRY	U	SW8270C
2600	BB-BC-01	Pyrene	<100	PPB	DRY	U	SW8270C
970	BB-BC-01	Butyl Benzyl Phthalate	<100	PPB	DRY	U	SW8270C
	BB-BC-01	3,3'-Dichlorbenzidine	<740	PPB	DRY	U	SW8270C
1300	BB-BC-01	Benzo(a)anthracene	<110	PPB	DRY	U	SW8270C
1400	BB-BC-01	Chrysene	<120	PPB	DRY	U	SW8270C
8300	BB-BC-01	bis(2-Ethylhexyl)phthalate	<80	PPB	DRY	U	SW8270C
6200	BB-BC-01	Di-n-octyl phthalate	<90	PPB	DRY	U	SW8270C
600	BB-BC-01	Indeno (1,2,3-cd)Pyrene	<77	PPB	DRY	U	SW8270C
3200	BB-BC-01	Benzo(b,k)fluoranthene	<140	PPB	DRY	U	SW8270C
1600	BB-BC-01	Benzo(a)pyrene	<120	PPB	DRY	U	SW8270C
230	BB-BC-01	Dibenzo(a,h)Anthracene	<120	PPB	DRY	U	SW8270C
670	BB-BC-01	Benzo (g,h,i) perylene	<74	PPB	DRY	U	SW8270C

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SL	ID	CHEMICAL_NAME	CONC MDL	UNIT	BASIS	CODE	ANALYSIS
	BB-BC-01	2-FLUOROPHENOL (SURR)	71.6	PCT		#	SW8270C
	BB-BC-01	PHENOL-D5 (SURR)	74.3	PCT		#	SW8270C
	BB-BC-01	NITROBENZENE-D5 (SURR)	61.4	PCT		#	SW8270C
	BB-BC-01	2-FLUOROBIPHENYL (SURR)	37.0	PCT		#	SW8270C
	BB-BC-01	2,4,6-TRIBROMOPHENOL (SURR)	55.2	PCT		#	SW8270C
	BB-BC-01	TERPHENYL-D14 (SURR)	41.5	PCT		#	SW8270C
	BB-BC-01	Metals Analyses ICP-AES				#	6010B
390	BB-BC-01	Copper	43.8	PPM	DRY	#	6010B
140	BB-BC-01	Nickel	20.1	PPM	DRY	#	6010B
410	BB-BC-01	Zinc	116	PPM	DRY	#	6010B
150	BB-BC-01	Antimony	0.26	PPM	DRY	UJ	6010B
57	BB-BC-01	Arsenic	10.3	PPM	DRY	#	6010B
450	BB-BC-01	Lead	19.3	PPM	DRY	#	6010B
5.1	BB-BC-01	Cadmium	<0.077	PPM	DRY	U	6010B
6.1	BB-BC-01	Silver	<0.631	PPM	DRY	U	6010B
	BB-BC-01	Mercury CVAAS				#	EPA7471A
0.41	BB-BC-01	Mercury	0.17	PPM	DRY	#	EPA7471A
	BB-BC-01	Organotin - Water				#	KRONE
0.15	BB-BC-01	Tetrabutyltin	<0.05	UGL	POR	U	KRONE
0.15	BB-BC-01	Tributyltin	<0.02	UGL	POR	U	KRONE
0.15	BB-BC-01	Dibutyltin	<0.05	UGL	POR	U	KRONE
0.15	BB-BC-01	Monobutyltin	<0.05	UGL	POR	U	KRONE
	BB-BC-01	Organotin - Soil				#	KRONE
	BB-BC-01	Tetrabutyltin	<2.1	PPB	DRY	U	KRONE
	BB-BC-01	Tributyltin	<2.1	PPB	DRY	U	KRONE
	BB-BC-01	Dibutyltin	<2.1	PPB	DRY	U	KRONE
	BB-BC-01	Monobutyltin	2.1	PPB	DRY	UJ	KRONE
	BB-BC-01	Percent Solids	43	PCT		#	#
	BB-BC-01	Percent Moisture	57	PCT		#	#
	BB-BC-02	Total Organic Carbon	12,000	PPM	TOC	#	#
	BB-BC-02	Pesticides & PCBs				#	SW8080
	BB-BC-02	alpha-BHC	<0.2	PPB	DRY	U	SW8080
10	BB-BC-02	gamma-BHC (Lindane)	<0.3	PPB	DRY	U	SW8080
	BB-BC-02	beta-BHC	<0.4	PPB	DRY	U	SW8080
10	BB-BC-02	Aldrin	<0.2	PPB	DRY	U	SW8080
10	BB-BC-02	Heptachlor	<0.2	PPB	DRY	U	SW8080
	BB-BC-02	delta-BHC	<0.5	PPB	DRY	U	SW8080
	BB-BC-02	Heptachlor Epoxide	<0.4	PPB	DRY	U	SW8080
	BB-BC-02	Endosulfan I	<0.3	PPB	DRY	U	SW8080
∑6.9	BB-BC-02	4,4'-DDE	<0.3	PPB	DRY	U	SW8080

BAKER BAY
WEST CHANNEL
LABORATORY CHEMICAL DATA

Appendix A

SL	ID	CHEMICAL_NAME	CONC MDL	UNIT	BASIS	CODE	ANALYSIS
10	BB-BC-02	Dieldrin	<0.3	PPB	DRY	U	SW8080
	BB-BC-02	Endrin	<0.2	PPB	DRY	U	SW8080
∑6.9	BB-BC-02	4,4'-DDD	<0.6	PPB	DRY	U	SW8080
	BB-BC-02	Endosulfan II	<0.4	PPB	DRY	U	SW8080
	BB-BC-02	Endrin Aldehyde	<0.5	PPB	DRY	U	SW8080
∑6.9	BB-BC-02	4,4'-DDT	<0.7	PPB	DRY	U	SW8080
	BB-BC-02	Endosulfan Sulfate	<0.5	PPB	DRY	U	SW8080
	BB-BC-02	Methoxychlor	<0.7	PPB	DRY	U	SW8080
	BB-BC-02	Endrin Ketone	<0.3	PPB	DRY	U	SW8080
10	BB-BC-02	Chlordane	<14	PPB	DRY	U	SW8080
	BB-BC-02	Toxaphene	<13	PPB	DRY	U	SW8080
∑130	BB-BC-02	PCB-1016	<5	PPB	DRY	U	SW8080
∑130	BB-BC-02	PCB-1221	<3	PPB	DRY	U	SW8080
∑130	BB-BC-02	PCB-1232	<15	PPB	DRY	U	SW8080
∑130	BB-BC-02	PCB-1242	<3	PPB	DRY	U	SW8080
∑130	BB-BC-02	PCB-1248	<7	PPB	DRY	U	SW8080
∑130	BB-BC-02	PCB-1254	<2	PPB	DRY	U	SW8080
∑130	BB-BC-02	PCB-1260	<6	PPB	DRY	U	SW8080
	BB-BC-02	TCMX (SURROGATE)	26.6	PCT		#	SW8080
	BB-BC-02	DCB (SURROGATE)	26.6	PCT		#	SW8080
	BB-BC-02	B/NA Extractables Soil				#	SW8270C
	BB-BC-02	bis(2-Chloroethyl)ether	<130	PPB	DRY	U	SW8270C
420	BB-BC-02	Phenol	<130	PPB	DRY	U	SW8270C
	BB-BC-02	2-Chlorophenol	<110	PPB	DRY	U	SW8270C
170	BB-BC-02	1,3-Dichlorobenzene	<120	PPB	DRY	U	SW8270C
110	BB-BC-02	1,4-Dichlorobenzene	<110	PPB	DRY	U	SW8270C
35	BB-BC-02	1,2-Dichlorobenzene	<130	PPB	DRY	U	SW8270C
	BB-BC-02	2,2'-oxybis(1-Chloropropane	<130	PPB	DRY	U	SW8270C
63	BB-BC-02	2-Methyl Phenol	<170	PPB	DRY	U	SW8270C
1400	BB-BC-02	Hexachloroethane	<130	PPB	DRY	U	SW8270C
28	BB-BC-02	N-Nitroso-di-n-propylamine	<140	PPB	DRY	U	SW8270C
670	BB-BC-02	3&4-Methyl Phenol	<490	PPB	DRY	U	SW8270C
	BB-BC-02	Nitrobenzene	<140	PPB	DRY	U	SW8270C
	BB-BC-02	Isophorone	<120	PPB	DRY	U	SW8270C
	BB-BC-02	2-Nitrophenol	<100	PPB	DRY	U	SW8270C
29	BB-BC-02	2,4-Dimethylphenol	<130	PPB	DRY	U	SW8270C
	BB-BC-02	bis (2-Chloroethoxy)	<130	PPB	DRY	U	SW8270C
	BB-BC-02	2,4-Dichlorophenol	<110	PPB	DRY	U	SW8270C
31	BB-BC-02	1,2,4-Trichlorobenzene	<120	PPB	DRY	U	SW8270C
2100	BB-BC-02	Naphthalene	<120	PPB	DRY	U	SW8270C
29	BB-BC-02	Hexachlorobutadiene	<130	PPB	DRY	U	SW8270C
	BB-BC-02	4-Chloro-3-methylphenol	<120	PPB	DRY	U	SW8270C
670	BB-BC-02	2-Methyl Naphthalene	<110	PPB	DRY	U	SW8270C
	BB-BC-02	Hexachlorocyclopentadiene	<56	PPB	DRY	U	SW8270C
	BB-BC-02	2,4,6-Trichlorophenol	<110	PPB	DRY	U	SW8270C

BAKER BAY
WEST CHANNEL
LABORATORY CHEMICAL DATA

Appendix A

SL	ID	CHEMICAL_NAME	CONC MDL	UNIT	BASIS	CODE	ANALYSIS
	BB-BC-02	2,4,5-Trichlorophenol	<130	PPB	DRY	U	SW8270C
	BB-BC-02	2-Chloronaphthalene	<120	PPB	DRY	U	SW8270C
560	BB-BC-02	Acenaphthylene	<120	PPB	DRY	U	SW8270C
1400	BB-BC-02	Dimethyl Phthalate	<100	PPB	DRY	U	SW8270C
500	BB-BC-02	Acenapthene	<90	PPB	DRY	U	SW8270C
	BB-BC-02	2,4-Dinitrophenol	<40	PPB	DRY	U	SW8270C
	BB-BC-02	2,4-Dinitrotoluene	<90	PPB	DRY	U	SW8270C
	BB-BC-02	4-Nitrophenol	<120	PPB	DRY	U	SW8270C
540	BB-BC-02	Fluorene	<90	PPB	DRY	U	SW8270C
	BB-BC-02	4-Chlorophenyl Phenyl Ether	<110	PPB	DRY	U	SW8270C
1200	BB-BC-02	Diethyl Phthalate	<80	PPB	DRY	U	SW8270C
	BB-BC-02	2-Methyl-4,6-dinitrophenol	<60	PPB	DRY	U	SW8270C
28	BB-BC-02	N-Nitrosodiphenylamine	<60	PPB	DRY	U	SW8270C
	BB-BC-02	4-Bromophenyl Phenyl Ether	<90	PPB	DRY	U	SW8270C
22	BB-BC-02	Hexachlorobenzene	<75	PPB	DRY	U	SW8270C
400	BB-BC-02	Pentachlorophenol	<60	PPB	DRY	U	SW8270C
1500	BB-BC-02	Phenanthrene	<70	PPB	DRY	U	SW8270C
960	BB-BC-02	Anthracene	<90	PPB	DRY	U	SW8270C
5100	BB-BC-02	Di-n-butylphthalate	<80	PPB	DRY	U	SW8270C
1700	BB-BC-02	Fluoranthene	<70	PPB	DRY	U	SW8270C
	BB-BC-02	Benzidine	<1000	PPB	DRY	U	SW8270C
2600	BB-BC-02	Pyrene	<80	PPB	DRY	U	SW8270C
970	BB-BC-02	Butyl Benzyl Phthalate	<80	PPB	DRY	U	SW8270C
	BB-BC-02	3,3'-Dichlorbenzidine	<530	PPB	DRY	U	SW8270C
1300	BB-BC-02	Benzo(a)anthracene	<78	PPB	DRY	U	SW8270C
1400	BB-BC-02	Chrysene	<86	PPB	DRY	U	SW8270C
8300	BB-BC-02	bis(2-Ethylhexyl)phthalate	<60	PPB	DRY	U	SW8270C
6200	BB-BC-02	Di-n-octyl phthalate	<60	PPB	DRY	U	SW8270C
600	BB-BC-02	Indeno (1,2,3-cd)Pyrene	<56	PPB	DRY	U	SW8270C
3200	BB-BC-02	Benzo(b,k)fluoranthene	<100	PPB	DRY	U	SW8270C
1600	BB-BC-02	Benzo(a)pyrene	<89	PPB	DRY	U	SW8270C
230	BB-BC-02	Dibenzo(a,h)Anthracene	<89	PPB	DRY	U	SW8270C
670	BB-BC-02	Benzo (g,h,i) perylene	<54	PPB	DRY	U	SW8270C
	BB-BC-02	2-FLUOROPHENOL (SURR)	66.4	PCT		#	SW8270C
	BB-BC-02	PHENOL-D5 (SURR)	71.1	PCT		#	SW8270C
	BB-BC-02	NITROBENZENE-D5 (SURR)	58.5	PCT		#	SW8270C
	BB-BC-02	2-FLUOROBIPHENYL (SURR)	30.5	PCT		#	SW8270C
	BB-BC-02	2,4,6-TRIBROMOPHENOL (SURR)	47.4	PCT		#	SW8270C
	BB-BC-02	TERPHENYL-D14 (SURR)	35.1	PCT		#	SW8270C
	BB-BC-02	Metals Anlaysis ICP-AES				#	6010B
390	BB-BC-02	Copper	27.3	PPM	DRY	#	6010B

BAKER BAY
WEST CHANNEL
LABORATORY CHEMICAL DATA

Appendix A

SL	ID	CHEMICAL_NAME	CONC MDL	UNIT	BASIS	CODE	ANALYSIS
140	BB-BC-02	Nickel	15.2	PPM	DRY	#	6010B
410	BB-BC-02	Zinc	89.3	PPM	DRY	#	6010B
150	BB-BC-02	Antimony	0.190	PPM	DRY	UJ	6010B
57	BB-BC-02	Arsenic	6.5	PPM	DRY	#	6010B
450	BB-BC-02	Lead	13.9	PPM	DRY	#	6010B
5.1	BB-BC-02	Cadmium	<0.056	PPM	DRY	U	6010B
6.1	BB-BC-02	Silver	<0.228	PPM	DRY	U	6010B
	BB-BC-02	Mercury CVAAS				#	EPA7471A
0.41	BB-BC-02	Mercury	0.08	PPM	DRY	#	EPA7471A
	BB-BC-02	Percent Solids	59	PCT		#	#
	BB-BC-02	Percent Moisture	41	PCT		#	#
	BB-BC-03	Total Organic Carbon	11,000	DRY	TOC	#	#
	BB-BC-03	Pesticides & PCBs				#	SW8080
	BB-BC-03	alpha-BHC	<0.2	PPB	DRY	U	SW8080
10	BB-BC-03	gamma-BHC (Lindane)	<0.3	PPB	DRY	U	SW8080
	BB-BC-03	beta-BHC	<0.4	PPB	DRY	U	SW8080
10	BB-BC-03	Aldrin	<0.2	PPB	DRY	U	SW8080
10	BB-BC-03	Heptachlor	<0.2	PPB	DRY	U	SW8080
	BB-BC-03	delta-BHC	<0.5	PPB	DRY	U	SW8080
	BB-BC-03	Heptachlor Epoxide	<0.4	PPB	DRY	U	SW8080
	BB-BC-03	Endosulfan I	<0.3	PPB	DRY	U	SW8080
∑6.9	BB-BC-03	4,4'-DDE	<0.3	PPB	DRY	U	SW8080
10	BB-BC-03	Dieldrin	<0.3	PPB	DRY	U	SW8080
	BB-BC-03	Endrin	<0.2	PPB	DRY	U	SW8080
∑6.9	BB-BC-03	4,4'-DDD	<0.6	PPB	DRY	U	SW8080
	BB-BC-03	Endosulfan II	<0.4	PPB	DRY	U	SW8080
	BB-BC-03	Endrin Aldehyde	<0.5	PPB	DRY	U	SW8080
∑6.9	BB-BC-03	4,4'-DDT	<0.7	PPB	DRY	U	SW8080
	BB-BC-03	Endosulfan Sulfate	<0.5	PPB	DRY	U	SW8080
	BB-BC-03	Methoxychlor	<0.7	PPB	DRY	U	SW8080
	BB-BC-03	Endrin Ketone	<0.3	PPB	DRY	U	SW8080
10	BB-BC-03	Chlordane	<15	PPB	DRY	U	SW8080
	BB-BC-03	Toxaphene	<13	PPB	DRY	U	SW8080
∑130	BB-BC-03	PCB-1016	<5	PPB	DRY	U	SW8080
∑130	BB-BC-03	PCB-1221	<4	PPB	DRY	U	SW8080
∑130	BB-BC-03	PCB-1232	<16	PPB	DRY	U	SW8080
∑130	BB-BC-03	PCB-1242	<3	PPB	DRY	U	SW8080
∑130	BB-BC-03	PCB-1248	<7	PPB	DRY	U	SW8080
∑130	BB-BC-03	PCB-1254	<2	PPB	DRY	U	SW8080
∑130	BB-BC-03	PCB-1260	<6	PPB	DRY	U	SW8080
	BB-BC-03	TCMX (SURROGATE)	27	PCT		#	SW8080
	BB-BC-03	DCB (SURROGATE)	25	PCT		#	SW8080
	BB-BC-03	B/NA Extractables Soil				#	SW8270C
	BB-BC-03	bis(2-Chloroethyl)ether	<130	PPB	DRY	U	SW8270C

BAKER BAY
WEST CHANNEL
LABORATORY CHEMICAL DATA

Appendix A

SL	ID	CHEMICAL_NAME	CONC MDL	UNIT	BASIS	CODE	ANALYSIS
420	BB-BC-03	Phenol	<130	PPB	DRY	U	SW8270C
	BB-BC-03	2-Chlorophenol	<110	PPB	DRY	U	SW8270C
170	BB-BC-03	1,3-Dichlorobenzene	<120	PPB	DRY	U	SW8270C
110	BB-BC-03	1,4-Dichlorobenzene	<110	PPB	DRY	U	SW8270C
35	BB-BC-03	1,2-Dichlorobenzene	<130	PPB	DRY	U	SW8270C
	BB-BC-03	2,2'-oxybis(1-Chloropropane	<130	PPB	DRY	U	SW8270C
63	BB-BC-03	2-Methyl Phenol	<170	PPB	DRY	U	SW8270C
1400	BB-BC-03	Hexachloroethane	<140	PPB	DRY	U	SW8270C
28	BB-BC-03	N-Nitroso-di-n-propylamine	<140	PPB	DRY	U	SW8270C
670	BB-BC-03	3&4-Methyl Phenol	<500	PPB	DRY	U	SW8270C
	BB-BC-03	Nitrobenzene	<140	PPB	DRY	U	SW8270C
	BB-BC-03	Isophorone	<120	PPB	DRY	U	SW8270C
	BB-BC-03	2-Nitrophenol	<100	PPB	DRY	U	SW8270C
29	BB-BC-03	2,4-Dimethylphenol	<130	PPB	DRY	U	SW8270C
	BB-BC-03	bis (2-Chloroethoxy)	<130	PPB	DRY	U	SW8270C
	BB-BC-03	2,4-Dichlorophenol	<110	PPB	DRY	U	SW8270C
31	BB-BC-03	1,2,4-Trichlorobenzene	<120	PPB	DRY	U	SW8270C
2100	BB-BC-03	Naphthalene	<120	PPB	DRY	U	SW8270C
29	BB-BC-03	Hexachlorobutadiene	<120	PPB	DRY	U	SW8270C
	BB-BC-03	4-Chloro-3-methylphenol	<120	PPB	DRY	U	SW8270C
670	BB-BC-03	2-Methyl Naphthalene	<110	PPB	DRY	U	SW8270C
	BB-BC-03	Hexachlorocyclopentadiene	<57	PPB	DRY	U	SW8270C
	BB-BC-03	2,4,6-Trichlorophenol	<110	PPB	DRY	U	SW8270C
	BB-BC-03	2,4,5-Trichlorophenol	<130	PPB	DRY	U	SW8270C
	BB-BC-03	2-Chloronaphthalene	<120	PPB	DRY	U	SW8270C
560	BB-BC-03	Acenaphthylene	<120	PPB	DRY	U	SW8270C
1400	BB-BC-03	Dimethyl Phthalate	<100	PPB	DRY	U	SW8270C
500	BB-BC-03	Acenapthene	<90	PPB	DRY	U	SW8270C
	BB-BC-03	2,4-Dinitrophenol	<40	PPB	DRY	U	SW8270C
	BB-BC-03	2,4-Dinitrotoluene	<90	PPB	DRY	U	SW8270C
	BB-BC-03	4-Nitrophenol	<120	PPB	DRY	U	SW8270C
540	BB-BC-03	Fluorene	<90	PPB	DRY	U	SW8270C
	BB-BC-03	4-Chlorophenyl Phenyl Ether	<110	PPB	DRY	U	SW8270C
1200	BB-BC-03	Diethyl Phthalate	<80	PPB	DRY	U	SW8270C
	BB-BC-03	2-Methyl-4,6-dinitrophenol	<60	PPB	DRY	U	SW8270C
28	BB-BC-03	N-Nitrosodiphenylamine	<60	PPB	DRY	U	SW8270C
	BB-BC-03	4-Bromophenyl Phenyl Ether	<90	PPB	DRY	U	SW8270C
22	BB-BC-03	Hexachlorobenzene	<77	PPB	DRY	U	SW8270C
400	BB-BC-03	Pentachlorophenol	<60	PPB	DRY	U	SW8270C
1500	BB-BC-03	Phenanthrene	<70	PPB	DRY	U	SW8270C
960	BB-BC-03	Anthracene	<90	PPB	DRY	U	SW8270C
5100	BB-BC-03	Di-n-butylphthalate	<80	PPB	DRY	U	SW8270C
1700	BB-BC-03	Fluoranthene	<70	PPB	DRY	U	SW8270C
	BB-BC-03	Benzidine	<1000	PPB	DRY	U	SW8270C
2600	BB-BC-03	Pyrene	<80	PPB	DRY	U	SW8270C

BAKER BAY
WEST CHANNEL
LABORATORY CHEMICAL DATA

Appendix A

SL	ID	CHEMICAL_NAME	CONC MDL	UNIT	BASIS	CODE	ANALYSIS
970	BB-BC-03	Butyl Benzyl Phthalate	<80	PPB	DRY	U	SW8270C
	BB-BC-03	3,3'-Dichlorbenzidine	<540	PPB	DRY	U	SW8270C
1300	BB-BC-03	Benzo(a)anthracene	<79	PPB	DRY	U	SW8270C
1400	BB-BC-03	Chrysene	<88	PPB	DRY	U	SW8270C
8300	BB-BC-03	bis(2-Ethylhexyl)phthalate	<60	PPB	DRY	U	SW8270C
6200	BB-BC-03	Di-n-octyl phthalate	<60	PPB	DRY	U	SW8270C
600	BB-BC-03	Indeno (1,2,3-cd)Pyrene	<57	PPB	DRY	U	SW8270C
3200	BB-BC-03	Benzo(b,k)fluoranthene	<100	PPB	DRY	U	SW8270C
1600	BB-BC-03	Benzo(a)pyrene	<91	PPB	DRY	U	SW8270C
230	BB-BC-03	Dibenzo(a,h)Anthracene	<91	PPB	DRY	U	SW8270C
670	BB-BC-03	Benzo (g,h,i) perylene	<55	PPB	DRY	U	SW8270C
	BB-BC-03	2-FLUOROPHENOL (SURR)	65	PCT		#	SW8270C
	BB-BC-03	PHENOL-D5 (SURR)	69	PCT		#	SW8270C
	BB-BC-03	NITROBENZENE-D5 (SURR)	63	PCT		#	SW8270C
	BB-BC-03	2-FLUOROBIPHENYL (SURR)	33	PCT		#	SW8270C
	BB-BC-03	2,4,6-TRIBROMOPHENOL (SURR)	52	PCT		#	SW8270C
	BB-BC-03	TERPHENYL-D14 (SURR)	33	PCT		#	SW8270C
	BB-BC-03	Metals Anlaysis ICP-AES				#	6010B
390	BB-BC-03	Copper	28	PPM	DRY	#	6010B
140	BB-BC-03	Nickel	15.3	PPM	DRY	#	6010B
410	BB-BC-03	Zinc	93.5	PPM	DRY	#	6010B
150	BB-BC-03	Antimony	0.200	PPM	DRY	UJ	6010B
57	BB-BC-03	Arsenic	6.16	PPM	DRY	#	6010B
450	BB-BC-03	Lead	14.5	PPM	DRY	#	6010B
5.1	BB-BC-03	Cadmium	<0.059	PPM	DRY	U	6010B
6.1	BB-BC-03	Silver	<0.48	PPM	DRY	U	6010B
	BB-BC-03	Mercury CVAAS				#	EPA7471A
0.41	BB-BC-03	Mercury	0.08	PPM	DRY	#	EPA7471A
	BB-BC-03	Percent Solids	58	PCT		#	#
	BB-BC-03	Percent Moisture	42	PCT		#	#